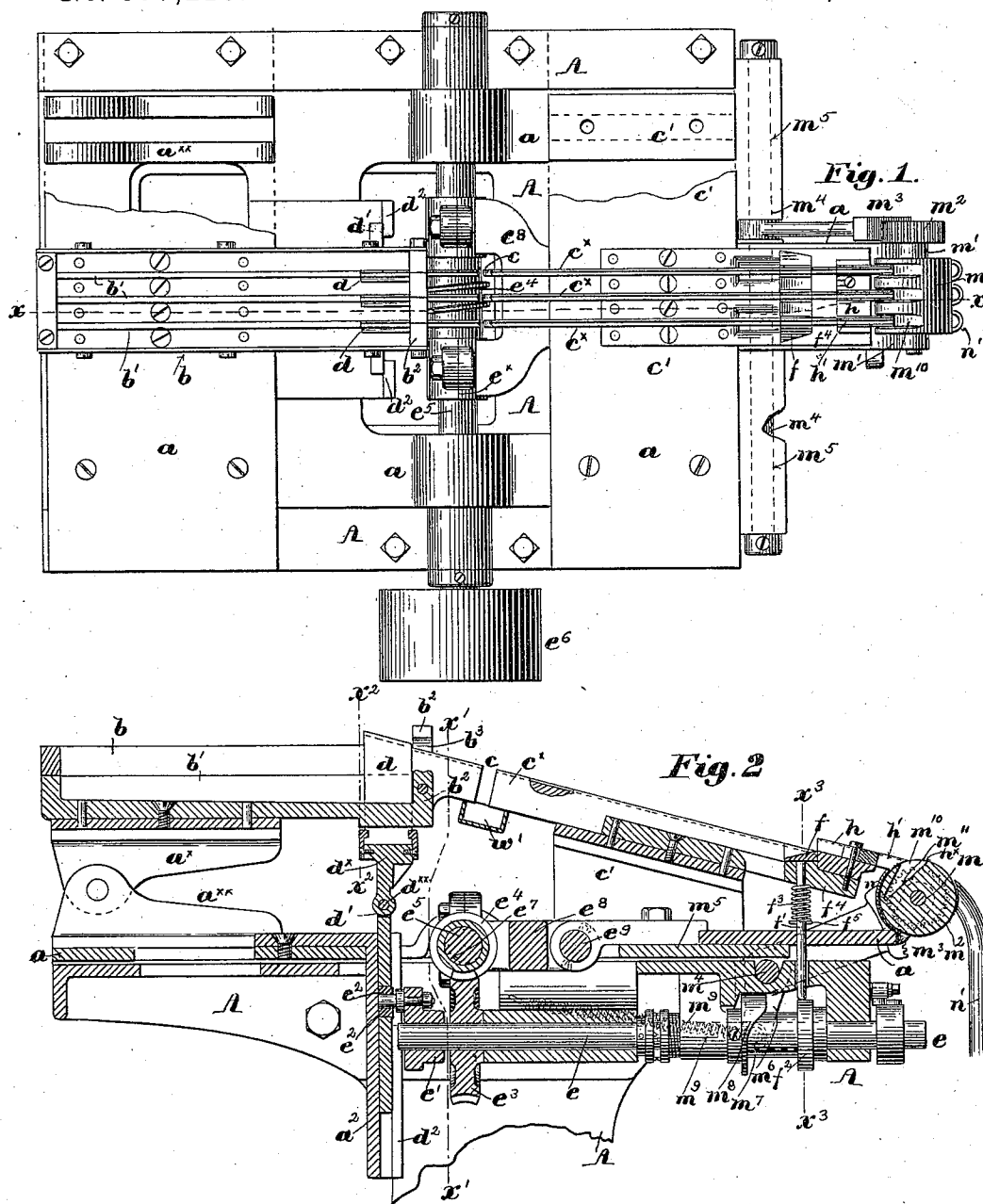


C. C. SMALL.

NAIL SELECTING AND DISTRIBUTING MACHINE.

No. 577,213.

Patented Feb. 16, 1897.



Witnesses:
Walter E. Lombard,
Thomas J. Drummond

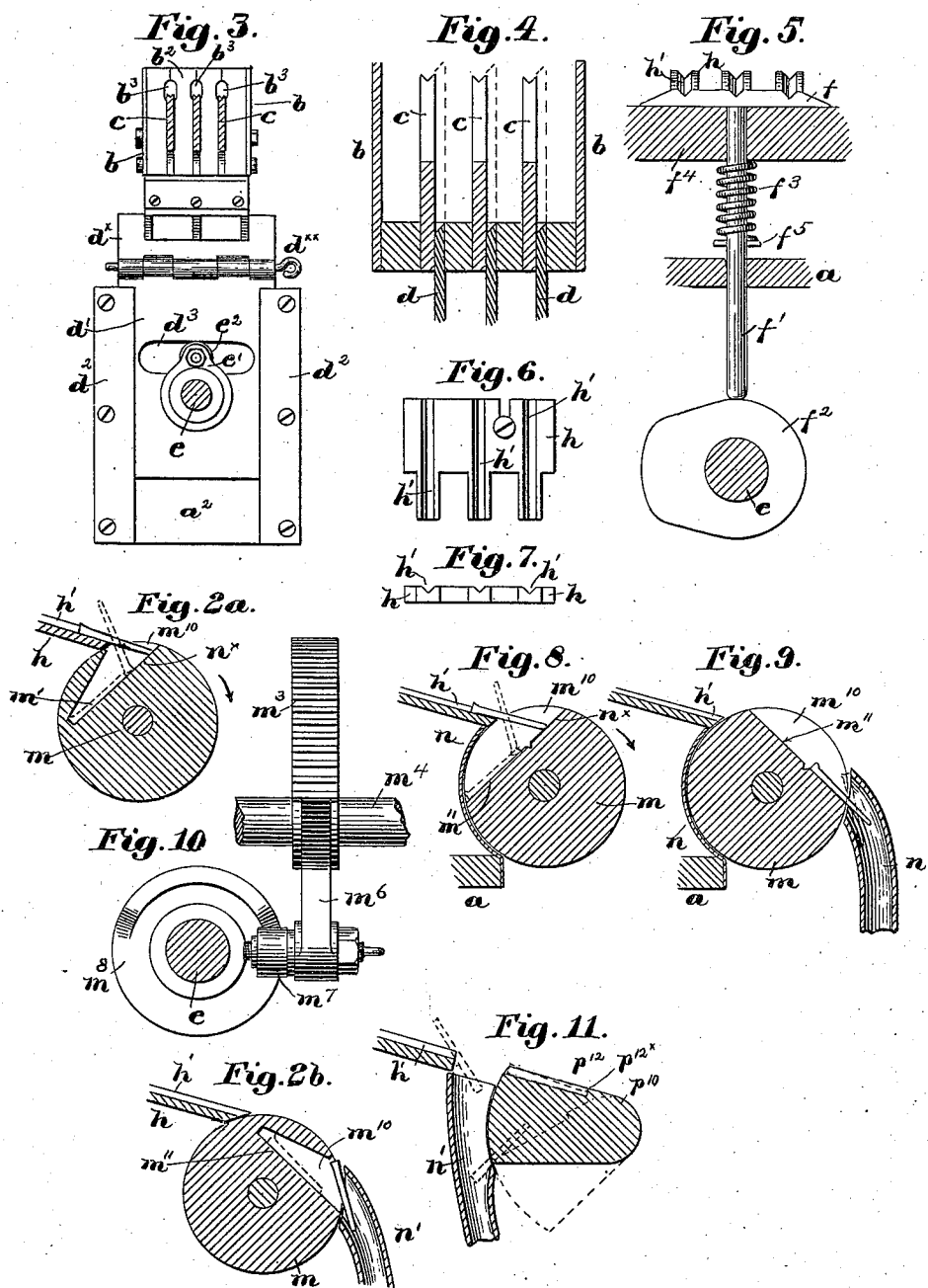
Inventor:
Chester C. Small,
by Crosby Gregory,
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UNITED STATES PATENT OFFICE.

CHESTER C. SMALL, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO JAMES W. BROOKS, PRINCIPAL TRUSTEE, OF PETERSHAM, AND JOHN BROOKS, ASSOCIATE TRUSTEE, OF CAMBRIDGE, MASSACHUSETTS.

NAIL SELECTING AND DISTRIBUTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 577,213, dated February 16, 1897.

Application filed February 27, 1893. Serial No. 581,023. (No model.)

To all whom it may concern:

Be it known that I, CHESTER C. SMALL, of Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in Nail Selecting and Distributing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to provide a novel machine for selecting and distributing nails or other fastenings, particularly such as are used in connection with the manufacture of boots and shoes.

In machines of this class the nails are usually deposited in bulk in a suitable hopper or receptacle, which may be denominated as a "nail source," from which they are taken and fed upon suitable raceways, down which they travel. In taking the nails from the source, however, there can be no certainty that the small or point ends of the nails will always face in the same direction, and an essential requisite of a machine of this type is that it be capable of reversing or turning end for end the nails the head ends of which face in a wrong direction, so that all the nails may ultimately point in the same direction.

In another application, filed concurrently with this, I have shown and described a raceway for the reception of nails with their heads and points leading indifferently, and at the end of said raceway I have provided a nail-selecting pocket, into which only those nails traveling down the raceway head first will enter, they being made to enter the pocket by reason of the gravitation of their heavier leading or head ends, while those nails which travel down the raceway point first are further conducted by a suitable raceway or guide to the points desired or to be driven. In this present invention I provide what I call a "nail-controller," which is arranged in the path of travel of the nails, so that only those nails which come head first shall, on arriving at said controller, enter the same due to their gravity and be separated from the nails which come point first.

The nail-controller is so constructed and

so located with relation to the delivery ends of the receiving-raceways as to leave a space in which may enter the heads of only those nails coming from the receiving-raceway head first, and it has a stop-surface to arrest the ends of the nails coming from said raceways point first, the said nail-controller being a movable device so actuated that it may by its movements effect the discharge of its several nails with their points or their heads all in the same direction, thus obviating returning to the source from which the nails first put on the raceway were taken the nails which come down the receiving-raceway head first, as in another of my said applications.

My improved nail-controller acts as a nail-reverser for some of the nails, while other of the nails continue to travel into the distributing raceways or tubes in the condition with relation to their head and point ends that they occupied when first fed upon the receiving-raceway.

In the principal embodiment of my invention, to be hereinafter described, I have shown the nail-controller as provided with a stop-surface and otherwise so constructed or beveled with relation to the delivery end of the receiving-raceways as to present spaces, the said stop-surfaces acting to receive against them the ends of the nails discharged from the ends of the receiving-raceways point first and the spaces receiving the nails which leave the said raceways head first, the latter entering said spaces due to the action of gravity on their larger and heavier head ends, the distance between the acting part of the stop-surfaces and the delivery end of the raceway being less than the length of the nail.

The movement of the nail-controller, it having received nails, permits the nails traveling point first to continue their movements into suitable distributing raceways or tubes, while the nails entering the space head first are reversed point first and discharged to travel in the distributing raceways or tubes; but in a modification of my invention to be described by a slight change in the shape of the controller and in the location of the distributing raceways or tubes I may readily

cause the nails to be delivered all with their heads leading, if that should for any reason be desired.

Other features of my invention will be hereinafter more fully described, and particularly set forth in the claims at the end of this specification.

In the drawings, Figure 1 is a top or plan view, partially broken away, of a machine illustrating one form of my invention; Fig. 2, a vertical section of the same on the dotted line xx , Fig. 1. Fig. 2^a shows the nail-controller having the movable pocket on a larger scale, said figure showing nails as they will come to the controller; Fig. 2^b, a view of the same part in a different position; Fig. 3, a vertical cross-section on the irregular dotted line $x'x'$, Fig. 2; Fig. 4, a vertical sectional detail on the dotted line x^2x^2 , Fig. 2, looking to the right; Fig. 5, a vertical section on the dotted line x^3x^3 , Fig. 2; Figs. 6 and 7, plan and edge views, respectively, of the adjustable throat forming the delivery ends of the several receiving-raceways; Figs. 8 and 9, sectional details, on an enlarged scale, of a modified form of nail-controller, the two views showing the transferrer in its two extreme positions to illustrate the manner in which the nails which gravitate into the pocket are turned end for end into proper positions; Fig. 10, a detail showing the main shaft in cross-section with the cam thereupon and the sector actuated by the cam, and Fig. 11 shows yet another modification in the nail-controller whereby it is adapted to direct the larger ends of all the nails into the distributing raceways or tubes.

In the drawings, A is a suitable frame or bracket, on which is mounted to slide in suitable bearings the frame-plate a , by which the operative parts of the machine are carried and which is made to vibrate by suitable mechanism to be hereinafter described.

Suitably supported upon the rear end of the frame-plate a is a hopper or receptacle b , adapted to receive the nails or fastenings in bulk which are to be selected and distributed. This hopper is shown divided into several compartments by the longitudinal division-strips b' ; and in practice the nails or fastenings are usually distributed through these several compartments.

The front wall b^2 of the hopper b is shown as provided with a plurality of vertical slots b^3 for the reception of the elevated ends of the inclined raceways $c c^x$, of which, in the present embodiment of my invention, I have shown one for each of the division-strips $b' b'$ of the hopper b , the said raceways being arranged in line with and to constitute substantial continuations of the said division-strips, although raised at their elevated ends somewhat above the tops of said strips.

The hopper has at its under side an ear a^x , which is pivoted on an ear a^{xx} , and to enable the hopper to be overturned to empty out its contents I have divided the raceway c , mak-

ing of it two parts $c c^x$, the separation of the two parts in no way interfering with the passage of the nails. These raceway portions c^x are shown as supported on suitable brackets c' at the front end of the frame-plate a . (See Fig. 2.)

The top edges of the raceways c are grooved longitudinally, the grooves being preferably V-shaped in cross-section, and cooperating with the elevated ends of the raceways, within the hopper, are a series of nail-feeders d , one for each raceway, the said feeders, as herein shown, consisting of flat plates with their upper edges inclined to conform to the inclinations of the raceways, the said plates being arranged close beside the raceways and adapted to rise and fall through suitable slots in the bottom of the hopper. At their lower edges and beneath the hopper the several feeders d are secured to a common carrier-plate d^x , jointed at d^{xx} to a slide d' , which is adapted to be vertically reciprocated in suitable guideways d^2 , (see Figs. 2 and 3,) formed in a depending portion a^2 of the frame-plate a . The pin d^{xx} (see Figs. 2 and 3) may be withdrawn when the hopper is to be emptied of its contents.

The driving-shaft e , arranged to rotate in suitable bearings in the frame A, is provided at its inner end with a crank e' , having a roller or other stud e^2 , which enters a suitable slot d^3 in the carrier-plate d' , the rotation of the shaft causing vertical reciprocation of the carrier-plate and its feeders referred to.

The shaft e is driven in suitable manner, as, for instance, by a worm-wheel e^3 , fast thereon and in mesh with and driven by a worm e^4 on a cross-shaft e^5 , journaled in suitable bearings in the frame A and provided at one end with a suitable driving or clutch pulley e^6 .

Referring particularly to Fig. 4, it will be seen that the tops of the feeders d are also beveled downwardly toward the sides of the raceway with which it cooperates, so that in the normal operation of the machine, as the feeders pass through the body of nails or fastenings in the hopper, certain of the said nails or fastenings will be lodged on the feeders, and the latter as they rise will lift each a nail against the side wall of each raceway, and as the feeders rise above the edges of said raceways the nails on their beveled tops will slide laterally off into the grooves in the top edges of the raceways, down which they will move end to end, or in the direction of their length, their movement being due to the continual reciprocation of the frame-plate and the parts carried thereby, as will be described. This reciprocation of the frame-plate and its parts in the present instance is produced by providing the shaft e^5 at opposite ends of the worm e^4 with eccentric portions, which are engaged by a double eccentric-strap e^8 , jointed to the frame-plate a at e^9 , rotation of the shaft e^5 thus causing a continual forward-and-back

movement or reciprocation of the frame-plate and its parts, this movement being in the direction of the length of the raceway.

It is evident, of course, that some of the nails deposited by the lifters upon or in the raceways, as described, will have their heads or large ends in one direction and some with their heads or large ends in an opposite direction, and the nails under whatever arrangement of their heads will slide down the inclined raceways, and it is one of the principal functions of this machine to select or turn the nails the heads of which face in the wrong direction end for end, in order that all the nails may face or point in the same direction before they are distributed to such points as are necessary. The mechanism for this purpose will now be particularly described.

Referring to Figs. 1 and 2, each raceway has a portion h , called the "delivery" portion, which may be arranged at a higher level than the portion c^x , and between these two portions I have arranged in position to cross the several raceways a lifter f , it being provided at its upperside with as many grooves as there are raceways, into which grooves the nails coming down the raceways enter one at a time, said lifter in its lowermost position being a little below the top of the elevated portions h of the raceway. This lifter is shown as mounted upon a guided spindle f' , acted upon at its lower end by a suitable cam f^2 on the shaft e , a spring, as f^3 , interposed between the under side of the support f^4 and acting on a pin in the spindle f' , keeping the spindle against the cam.

The elevated portion or delivery end h of the raceway is shown separately in Figs. 6 and 7, it having as many inclined troughs or channels h' as there are raceways c^x , each arranged in line with one of the raceways, and as the lifter is elevated from the raceway portions marked c^x to the position or level of the portions marked h the nails on the lifter pass therefrom into the channels or grooves h' of the portions h .

In front of the delivery ends h of the receiving-raceways I have arranged the nail-controller m , it being herein shown as a rotatable device mounted in suitable journals carried in bearings m' of the frame-plate a , said controller being provided outside one of its bearings with a toothed pinion m^2 , in mesh with a toothed sector m^3 , fast on a shaft m^4 , journaled in suitable bearings of the part m^5 of the frame-plate, said sector being provided with a depending arm m^6 , (see Figs. 2 and 10,) provided at its free end with a roller or other suitable stud m^7 , which is acted upon by a face-cam m^8 , fast on and rotatable with the driving-shaft e , a spring m^9 (shown in dotted lines, Fig. 2) serving to maintain said roller-stud always in operative contact with the cam-surface.

The controller is shown as provided with a plurality of spaces or pockets m^{10} , one for each raceway, one side of each space or pocket

being longer than the other to present a second face to constitute a stop-surface n^x , against which the points or small ends of the nails descending the raceways point first may strike, as in Fig. 2^a, while the nails which descended the raceway head first will, due to their heavier leading ends, gravitate or drop into the spaces or pockets, as also shown in Fig. 2^a, and as the controller is moved into the position Fig. 2^b the nail in contact with it, in whichever condition, will be fed point first into the distributing raceways or tubes n' , the controller being then again moved back into the position Figs. 2 and 2^a.

The nails to be put into the distributing raceways or tubes are discharged in rows from the lifter f , and some are head and some point first, and each row of nails is handled separately by the controller.

If a nail passes from an extension h head first, it will drop into the spaces or pockets opposite it, as shown in Fig. 2^a, but if a nail leaves the extension point first the point will cross the space or pocket and will meet the stop-surface n^x , as in Fig. 2^a; but at no single time will two nails be in just the position shown by the two nails in Fig. 2^a, but one nail will occupy one or the other of said positions after each action of the lifter f , that depending upon the particular direction of the heads of the nails raised by the lifter f .

The secant face, forming the stop n^x , must occupy a position distant from the delivery ends h of the receiving-raceways less than the lengths of the nails traversing the receiving-raceways, preferably a distance equal to substantially one-half the length of the nails, and said delivery ends h to all intents and purposes constitute continuations of the raceways c^x , so that the nails deposited in the grooves at the tops of the delivery ends and sliding point first will strike the secant surface or stop n^x and the nail will remain in the position shown in Fig. 2^a, where its heavy or head end rests on the extremity of the portion h , and when the controller is moved or partially rotated the said nail will be carried over point first and be deposited in the tube n' , while if the nail delivered from the portion h should be head first it will enter the space or pocket head first, and when the controller is moved the nail so entering the space or pocket will be reversed and tipped out point first into the distributing raceway or tube. Thus any nails leaving the portion h with head or point first will have their motion continued into said distributing raceways or tubes with their heads or points all in the same direction.

Figs. 8 and 9 show a modification wherein the nail-controller has only a secant surface to form a stop n^x , the shield m , partially embracing the said controller, forming a part of a space or pocket for the reception of the nails coming from the delivery portions h head first, and at the next movement of the controller the nail thus carried head down will be car-

ried up and over and delivered point first into the distributing-raceway n' , as described, so that it matters not whether the nails reach the controller n point first or head first, they are in all cases delivered in like conditions to the distributing-raceways.

So far as known to me I am the first, in a machine of this class, to arrange opposite the ends of a series of raceways a series of secant or stop surfaces removed from the ends of the raceways by a distance less than the length of any nail traversing said raceway to arrest the point of the nails, and I am also the first to provide a series of spaces or pockets between the said stop-surfaces and said raceway ends into which any nails issuing head first from the raceways may gravitate, and thereafter by a movement of said stop-surfaces and spaces and pockets transfer the nails to a second or distributing raceway point first, or all arranged alike as to the direction of their points or heads.

In the machine herein shown the lifter f is provided solely for the purpose of delivering a row or series of nails to the controller.

In the claims the parts c , c^x , and h of the raceways are included under the single term "receiving-raceways," the fact that they are arranged at different levels not altering their functions so far as the present machine is concerned.

In Fig. 11 I have shown a circularly-movable controller made as an arm p^{10} , having a series of grooves p^{12} , terminating in a stop p^{12x} , one for each raceway, and the nails coming down head first gravitate directly into the distributing raceway or tube n' , (shown as located directly at the end of the raceway c , c^x , and h ,) while the nails coming down point first enter the grooves p^{12} and meet the stop and by a movement of the arm p^{10} are discharged head first into the tube n' .

It is evident my invention is not limited to the particular embodiment herein shown, nor is it limited to any specific number of raceways in the series nor to the particular location of the distributing-raceways, as my invention may be varied in all these particulars without departing from the spirit and scope of my invention.

The space between the portions c and c^x of the raceways performs the important function of separating any short slivers of metal, dust, dirt, &c., which may get onto the raceways, the said foreign matter dropping there-through in a suitable pan or receptacle w' .

Having described one embodiment of my invention, and without limiting myself as to details, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for assorting nails the following instrumentalities, viz: a series of raceways to receive and guide nails; a cooperating nail-controller crossing the delivery ends of said series of raceways and having a series of stop-surfaces and a series of spaces or pockets, one for each of said raceways, and

in the line of travel of the nails therein, said stop-surfaces being sufficiently removed from the ends of the raceways to enable those nails which travel head first, owing to the gravity of their heads, to enter said spaces or pockets; and means to move said controller to effect the reversal of the nails in the said spaces or pockets, and the discharge therefrom of the nails reaching it point first, substantially as described.

2. In a machine for assorting nails the following instrumentalities, viz: a series of raceways to receive and guide nails with their points and heads arranged indiscriminately; a cooperating movable nail-controller crossing the delivery ends of the said raceways and having a series of nail-receiving spaces or pockets and a series of stop-surfaces, a space or pocket and a stop-surface for each of said raceways and in line with the travel of the nails thereon, said stop-surfaces being sufficiently removed from the ends of the said raceways to enable those nails which travel head first, owing to the gravity of their heads, to enter said spaces or pockets, and means to move the nail-controller, whereby the nails leaving the raceways head first enter said spaces or pockets, and those point first are arrested temporarily by said stop-surfaces, the movement of the controller effecting the discharge point first of all the nails in contact with it, substantially as described.

3. In a machine for assorting nails, the following instrumentalities, viz: a series of raceways to receive and guide nails with their heads and points arranged indiscriminately, a cooperating movable nail-controller crossing the delivery ends of the said raceways and having a series of stop-surfaces, one for each of said raceways, to arrest the points of the nails descending point first, said stop-surfaces being sufficiently removed from the ends of said raceways to enable those nails which travel head first to drop directly from the raceway owing to the gravity of their heads and before their arrival at said stop-surfaces; and means to move said controller to effect the discharge of the nails stopped by it, substantially as described.

4. In a machine for assorting nails the following instrumentalities, viz: a series of raceways to receive and guide nails with their points and heads arranged indiscriminately; a cooperating movable nail-controller crossing the delivery ends of the said raceways and having a series of nail-receiving spaces or pockets and a series of stop-surfaces, a space or pocket and a stop-surface for each of said raceways and in line with the travel of the nails thereon, said stop-surfaces being sufficiently removed from the ends of the said raceways to enable those nails which travel head first, owing to the gravity of their heads, to enter said spaces or pockets, and means to move the said nail-controller, whereby the nails leaving the raceways head first enter said spaces or pockets and those point first

are arrested temporarily by said stop-surfaces, the movement of the controller effecting the discharge point first of all the nails in contact with it, and a series of distributing raceways or tubes to receive said nails, substantially as described.

5. In a machine for assorting nails the following instrumentalities, viz: a series of raceways to receive and guide nails with their points and heads arranged indiscriminately; a lifter arranged across the said receiving-raceways near their ends and provided with a series of grooves in line with the raceways each to receive a lowermost nail from one of said raceways, means to raise said lifter to cause it to raise the series of nails lodged on it and permit them to pass to the extremities or delivery ends of said raceways; a cooperating movable nail-controller crossing the delivery ends of the said raceways and having a series of nail-receiving spaces or pockets and a series of stop-surfaces, a space or pocket and a stop-surface for each of said raceways and in line with the travel of the nails thereon, said stop-surfaces being sufficiently removed from the ends of the said raceways to enable those nails which travel head first, owing to the gravity of their heads, to enter said spaces or pockets, and means to move the said nail-controller, whereby the nails leaving the raceways head first enter said spaces or pockets and those point first are arrested temporarily

by said stop-surfaces, the movement of the controller effecting the discharge point first of all the nails in contact with it, and a series of distributing raceways or tubes to receive said nails, substantially as described.

6. In a machine for assorting nails, a frame-plate, a hopper pivotally mounted thereon and slotted at its bottom, combined with a series of nail-lifters working through the slots in the bottom of the hopper, a jointed slide connected with and to operate said nail-lifters, and a series of raceways upon which the said lifters deposit nails, substantially as described.

7. In a machine of the class described, a raceway having portions at different levels, and an intermediate lifter to convey the nails from one to the other level, combined with a nail-controller located near the end of the higher level of the raceway, and means to rotate said nail-controller to cause the discharge of the nails arriving in contact with it point first into a discharge raceway or tube, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHESTER C. SMALL.

Witnesses:

GEO. W. GREGORY,
MARGARET ALICE DUNN.